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A conceptual framework for public health: NICE's emerging approach

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SUMMARY

This paper outlines the National Institute for Health and Clinical Excellence's (NICE) emerging conceptual framework for public health. This is based on the experience of the first 3 years of producing public health guidance at NICE (2005–2008). The framework has been used to shape the revisions to NICE's public health process and methods manuals for use post 2009, and will inform the public health guidance which NICE will produce from April 2009. The framework is based on the precept that both individual and population patterns of disease have causal mechanisms. These are analytically separate. Explanations of individual diseases involve the interaction between biological, social and related phenomena. Explanations of population patterns involve the same interactions, but also additional interactions between a range of other phenomena working in tandem. These are described. The causal pathways therefore involve the social, economic and political determinants of health, as well as psychological and biological factors. Four vectors of causation are identified: population, environmental, organizational and social. The interaction between the vectors and human behaviour are outlined. The bridge between the wider determinants and individual health outcomes is integration of the life course and the lifeworld.

Introduction

In 2005, the National Institute for Health and Clinical Excellence (NICE) began to produce public health guidance. The processes and methods used[1] were reviewed during 2007–2008 to take account of the experience of producing the public health guidance between 2005 and 2008. In the course of the review, a conceptual framework was developed to assist the process and to inform future guidance development. It is described in this paper (Fig. 1).

Many different models and frameworks are used to describe public health and the ways in which the health of the population is shaped.[2–8] NICE has drawn on these in various ways as it has developed its own approach. No critique of these other approaches is attempted here. Instead, some of the insights and understandings of these approaches are used to help construct the NICE framework. The NICE schema also draws on work undertaken by NICE for the World Health Organization (WHO) as part of the WHO Commission on the Social Determinants of Health.[9,10] The NICE Public Health Guidance on Behaviour Change[11] has also been influential.

The conceptual framework is based on six principles. First, that there are determinants of health and disease which include social, economic, psychological and biomedical factors. Second, these determinants not only impact on individuals to produce individual-level pathology, but also produce highly patterned health differences in populations which reflect inequalities in society. Third, the determinants work through discernable causal pathways. Fourth, the causal pathways help to identify ways of preventing and ameliorating disease. Fifth, there are also causal pathways for the promotion of health. Finally, positive and negative causal pathways cross physical, biological, social, economic, political and psychological discipline boundaries.

The vectors of public health

The core of the framework is the linkage of material, social, economic, political, psychological and biomedical phenomena in four vectors. The vectors are a means of classifying the determinants of health. They also allow for description of the way in which the structures of society interact with human behaviour. Two analytically distinct processes are at work. First (and quite conventionally), as a result of different physical contexts, external biological and other stimuli, the cells in the human body behave in ways that produce human health and disease in individuals. Second (less conventionally), collectivities of human bodies in human groups show the same or similar patterns of mortality and morbidity. So, the human body not only responds directly to physical and biological stimuli, but also to the social position that a person occupies. Therefore, the fact that at least some

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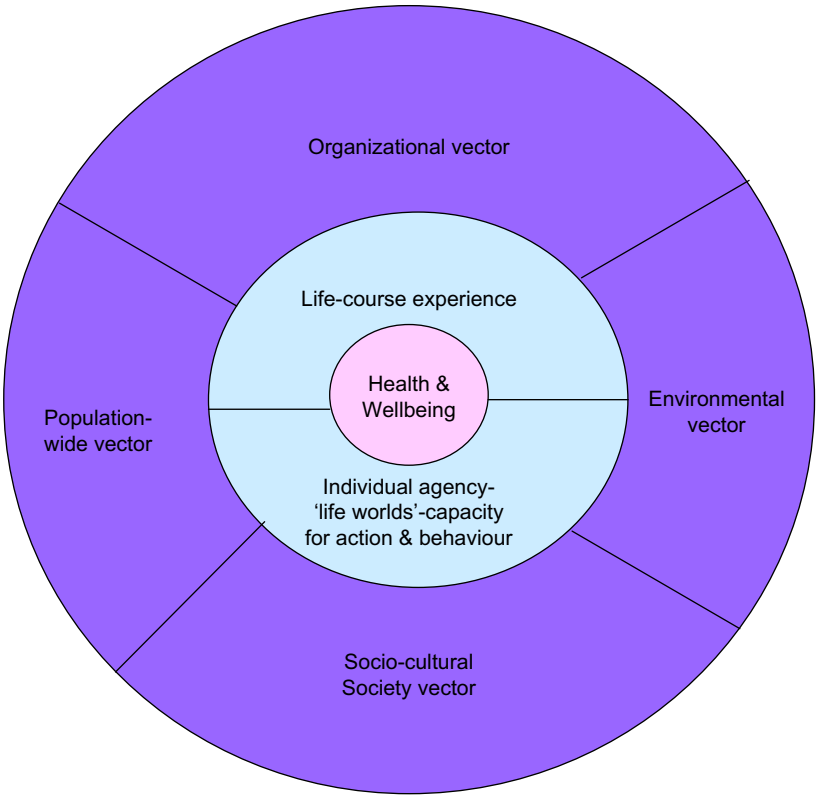

Figure 1. Conceptual framework for public health guidance.

pathological changes in the individual human body occur in highly patterned ways in whole populations or subpopulation groups requires explanation, in the same way that individual pathology requires explanation. The conceptual framework is based on the assumption that both the individual pathologies and their group patterning have causes. The conceptual framework distinguishes between the way social and biological factors work interactively to cause individual health outcomes, and the way they work in tandem to cause the patterns. The framework therefore deals with the links between the social and the biological. It does this by using the ideas of public health vectors, the life course and the lifeworld. The vectors outlined in the conceptual framework facilitate a causal approach. Empirically, the vectors are not distinct but are part of an overlapping and interacting set of forces. However, analytically they can be considered separately. Components of the vectors are called 'elements'.

The ways in which the broad determinants of health operate are of considerable research interest. This has received particular attention with respect to the determinants of health differences, health inequalities and health inequities in populations. Much is known. It is clear, and has been so for more than 150 years, that poor health is linked to social and economic disadvantage at population and individual levels.[12–15] The patterns of distribution of income and employment, access to education, housing and health services, and the noxiousness of the physical and material environment are linked to inequities in health.[16–18] However, while the general relationship between social factors and health is well established,[19] the relationship is not always described in causal terms.[6,20,21]

The population vector

The population vector includes those elements which affect, impinge or impact on the total population. States, governments and corporations are major elements. Other elements include supranational state formations such as the European Union, and concomitant legislation, taxation, and the rules and regulation used to manage relations within civil society and between civil society and the state. The degree to which the state permits democratic engagement, political and economic freedoms, and free speech; and the degree to which it is itself fragile or secure, corrupt or efficient, sets a context and also directly determines positive or negative health outcomes as well as configuring a range of other vectors of health.[22] In the UK, legislation to ensure the wearing of seat belts in cars, the ban on smoking in public places, and the prohibition of the sales of cigarettes, tobacco and alcohol to persons under 18 years of age are elements in the population vector. Another example of a public health element in this vector from the UK is enshrined in formal rules and regulations governing road use in the 'Highway code'. Laws to protect goods and services of high quality (e.g. certification of doctors and drugs), as well as the enforcement of these laws and the efficient use of information, all fall into this vector. In societies which are totalitarian, authoritarian, dictatorial or where the state is not self-regulated by principles of equality before the law, the impacts on the health and wellbeing of the population are generally, to varying degrees, malign.

A very significant element in the population vector is the economy, including the size and distribution of gross domestic product and incentives offered through the market, as well as barriers and facilitators to opportunity enshrined in market arrangements and practices. These, of course, overlap with the legislation mentioned in the previous paragraph. Incentives in the market, including the labour market and the regulation of market failure, are two very significant aspects of the economy, and its operation is fundamental to human health. Economic growth, rates of employment and economic freedom promote market opportunity, and cause damage when people lose their jobs or businesses fail. These things have direct effects on the livelihoods and life

chances of people. The extent to which markets are regulated and managed, and the degree to which protection is offered against the vicissitudes of the market are fundamental. As part of the regulatory structure of the economy, the taxation system is core. Related public health elements in the vector in the UK include the duty on beer, cigarettes, wine and spirits. The general fiscal structure, especially its regressive or progressive nature, and the amount of value-added tax on food and clothing are also good examples of elements in the population public health vector. Legislation and rules will be mediated by the degree to which laws and regulations are enforced and are complied with, and some groups and individuals will invariably deliberately seek to evade legal and other regulatory authority.

The evidence base for this vector resides in the political, sociological, philosophical and economic sciences, in the study of power relations and the forces of globalization. The idea that the state has a profound effect on the wellbeing or otherwise of the people is not new. Plato,[23] Thomas Hobbes,[24] Adam Smith[25] and John Stuart Mill,[26] for example, all provided important insights and frameworks for understanding these matters. Recently in Britain, the Nuffield Council on Bioethics[27] offered a contemporary analysis of the role of the state and public health. Indeed, the issue of the state's responsibility and the degree to which it can limit individual freedom in the name of promoting health is an important political question in any democratic society.

The environmental vector

The second vector is the environmental vector. Environmental elements in this vector include all those potentially noxious substances, microbes and particles which might be present in macro- and micro-environments, such as dust, lead, radon, asbestos and other things associated with industrial, agricultural, transport or construction activities, or occurring naturally in the environment. They may be present in the micro-environments of homes or workplaces, or in atmospheres in the wider environment. All water-, air-, plant-, insect-, animal- and human-borne infections are included. The environmental vector also embraces meteorological, tidal and geophysical hazards such as radiation, floods and drought, as well as longer term climatic threats and dangers. It includes microbiological agents, germs, viruses, bacteria, prions and other biological stressors; some psychological stressors and mediators such as noise, working conditions, etc.; transport systems, buildings, homes and the structural organization of workplaces and schools; and the systems of sanitation and provision of clean water.

In many ways, this is the traditional arena of public health. Clear causal pathways through well-defined vectors from agent to host are basic tools of understanding the interaction of the various elements and their impact on individual health. This is a very different evidence base from that of the philosophers, sociologists and political scientists of the population vector. The evidence base of the environment vector is grounded in biomedical and physical science. Some of this is the specialist concern of environmental health professionals, building planners and engineers, microbiologists, geophysicists and meteorologists. The interest of public health is in the detail, of course, but it is also the totality of the environmental elements as described here that provide both a macro- and microcontext for the world of experience, vulnerability and risk. These factors will be mediated, in part, by the actions of the state in the population vector, and also by various economic actors such as businesses and trade unions. Some of the hazards in the environment are more amenable to amelioration and control than others through regulation and management, and some by immunization, screening or other forms of medical intervention. Others, such as the forces of tides and climate are less easily controllable through regulation and legislation or any type of direct medical intervention. The causal pathways involving these elements in this vector are interactive because the familiar biological agent → vector → host aetiological pathway is often interactive with social or material factors in the vector.

The organizational vector

Most human activity which is not domestic takes place in social organizations of one type or another. Social organizations provide much of the framework or the architecture of social life in institutions such as bureaucracies, schools, factories, businesses, clubs, societies and religious organizations. There are libraries full of detailed descriptions of the structure and functioning of such organizations.[28–31] Clearly, they define important parts of the vectors associated with working and environmental factors which impinge directly on health. What the organizational vector does distinctly, however, is to provide a gateway between the population and environmental vectors to produce health outcomes. This is most easily demonstrated in this context by describing the way in which the organization of health care directly affects health with reference to access to and exclusion from services, although the work environment would be another good example to illustrate the point.

The patterns at issue in health care have been famously described as the 'inverse care law'.[32] Tudor Hart argued that the need for care varied inversely with the care provided. In other words, those in most need received the worst care and those in least need received the best care. Tudor Hart saw this as contributing significantly to health inequality. His observation is widely replicated in many and diverse healthcare settings. Tudor Hart's observation at first seems to fly in the face of evidence which suggested that services were of relatively minor importance when compared with sanitation, housing and nutrition in improving health.[33] The answer to this apparent contradiction is that historically, and especially in the era of rampant infectious disease, health services probably played a relatively minor role in maintaining the overall health of populations. However, they sometimes relieved suffering at individual level. However, technologies have improved and become more effective. Services have correspondingly become very important for health outcomes, health experience and ultimately mortality at population and individual level.[34] Therefore, services constitute an important gateway to health life chances individually and at population level. The way in which persons can get to the whole range of care from preventive services to acute and primary care mediates health outcomes.

A number of dimensions within this organizational vector can be applied to health services. The first is availability. People can only use a service if it is there. The second is entitlement. In the UK, for example, entitlement is universal regardless of any other social or economic factor. This is not the case in market systems or others which, in some way, limit entitlement through other mechanisms. But, of course, the story does not end there. Even with universal provision and entitlement, it does not follow that there will be universal access. So, the third element is the service configuration and the way in which it affects access. Included here are the ways in which the service is resourced, organized and delivered, and the behaviour of the employees in the service to the clients, patients and each other. Configuration also includes flexibility and responsiveness to the client group, to innovation in care and new pharmaceuticals, and its ability to implement new ways of working. Fourth is the relationship between the professional and managerial cadres, and of both cadres to the bureaucratic or other mechanisms of organization. In organizational terms, all of these things have a profound impact on effectiveness of care at all levels, and all have an impact on the way that clients engage with the service.[35] The

fifth element is the behaviour of the client groups themselves. The fact is that for well-documented and rational reasons, people make differential use of all types of service; they delay seeking treatment, they avoid preventive opportunities, they overuse services or use them inappropriately, and they act, for well-documented and readily understandable reasons, in ways which will not necessarily maximize the benefits they may derive individually from the service, and in ways which may diminish the effectiveness of interventions at population level.[36–38]

The social vector

The social vector consists of all those elements and factors that are linked to social, economic and cultural circumstances. However, very importantly, this vector also includes the nature of relationships between social groups in civil and economic society. In short, much of what happens to us and our health happens in patterned ways. Some risks and dangers vary enormously and systematically by place and population. Some people are at much greater risk than others. So, while environmental risk is ubiquitous, its impacts are highly patterned. Biology meets sociology in a very marked and enduring way, and the social vector helps to elucidate this.

The conventional way of describing the elements in the social vector in public health is by way of describing the epidemiological differences between social groups. Social categories such as class, status, ethnicity, age, gender, disability, religion, caste and tribe are the familiar axes of social differentiation which align in a graded way with differing rates of mortality and morbidity. These are the epidemiological patterns demonstrating the non-random nature of risk at population level. For the purposes of understanding how the process of patterning works, it is helpful to see beyond the statistics and the epidemiological aggregations, to the human behaviour underlying them and the relationships of power, discrimination, disadvantage and exploitation that are the relational correlates of social position.

Dealing with human behaviour first, these groupings contain patterns of social behaviours or what is sometimes called 'lifestyle'. There are groupings or clusters of ways of living associated with social position which are very good ecological predictors of future health outcomes and states. Much of the work of medical sociology and social epidemiology has been about plotting the excess morbidity and mortality associated with these social positions and the subcategories of these positions, and the associated risks of culturally engrained ways of living. The principal elements of human behaviour of particular interest in public health in Britain are smoking, eating (and associated consumer behaviour), alcohol consumption, physical activity (including active travel) and sexual behaviour. This is because these are the behaviours most closely associated with disease patterning. If the focus stays at this level, it can justifiably be criticized for victim blaming. However, the patterns of behaviour are still important and these are returned to below.

Conceptually, however, the ideas need to be developed a little further. Social class, ethnicity, gender and other social differences are not just the manifestation – albeit very stark manifestation – of the way in which social factors determine health; the dynamics of power and conflict between these groupings are central to understanding the mechanisms of the patterning of health.[6,21] The dynamic of causation of patterns of disease lies in the interaction between agency and structure in the microworlds of people's domestic and other lives. Giddens[39–41] argued that society was the product of interaction between individual human behaviour and the social structure. Billions and billions of individual human actions produce societal patterns independent of individual and collective intention or will. The patterns repeat themselves to such a degree that structures emerge. Although those structures change, sometimes gradually, sometimes rapidly, individuals are aware of them and orient their actions correspondingly (and are constrained by them). The vectors described above are structural. That is, they are components of the social structure. These vectors, with the possible exception of gross physical environmental elements, are themselves the product of human behaviour, and then in turn impact on it. Even elements in the environmental vectors are affected considerably by human actions, from everything such as climate change to the mutations of viruses and bacteria in the face of antivirals and antibiotics.

It is sometimes mistakenly asserted that the structures of society determine human behaviour. It is considerably more complex than that. A determinist position, i.e. one which fails to acknowledge the power of human agency to be creative and ingenious, inventive and non-conformist, as well as making the more mundane choices in everyday life, is deficient. Behaviour, although patterned and linked to social structure, is still under some degree of human individual control. Behaviour is not pre-programmed according to social position. In other words, notwithstanding well-defined patterns of behaviour at group level and strong associations between social position and health outcomes for example, this is neither a programming nor a deterministic effect. The social patterns of health and disease are subject to wide degrees of individual and subgroup variation. This variation is, in part, accounted for by the enormous variability in human behaviour. The important conceptual trick is to describe the variation and to find patterns within it. The conceptual vehicles to do this are the life course and the lifeworld. These, in turn, provide a means to explain causation from the vectors to the microbiology of the human body. These are explained in detail below.

The vectors and human behaviour

The biological and social interactions which lead to individual health outcomes derive principally from the environmental and organizational vectors. The tandem causation originates in the population and social vectors. So, while a heart attack is a biological event, the build-up of atherosclerosis is the consequence of diet and lifestyle linked to social position. And when the heart attack occurs, the speed of response time of the emergency services will be critical in whether a death is the endpoint. Mesothelioma leads to death but the inhalation of asbestos fibres is usually the result of occupational exposure. Death is caused by infection in an immunocompromised person with human immunodeficiency virus (HIV), but the exposure to HIV was caused by injecting illicit drugs using non-sterile injecting equipment. Bronchitis and emphysema are respiratory diseases involving biological change in the lungs, but smoking and housing conditions feature strongly in the interactive aetiology.

It is the social and population vectors working in tandem with the environmental and organizational vectors which accounts for the patterning of disease. The following example of an outbreak of diarrhoeal infection following flooding shows this. First, the interactive component: houses were built on a flood plain, natural phenomena leading to heavy rainfall caused flooding, and some residents whose houses were flooded developed diarrhoeal infections. The epidemiology of the outbreak showed that the residents who contracted infections were mainly from routine and manual occupations, and were living in cheaper housing areas. This outbreak had its immediate infective root in the bacteria in the sewage floating in the flood water. This is an interactive example of exposure to an environmental hazard – the bacteria – caused by the meteorological activity and the human activity in building houses on the flood plain. The second (tandem) part of the explanation relates to the contribution of the population and social vectors working in tandem with the biological processes. This focuses on

the nature of the power relations between the local planning authority, builders and the planning decision which led to cheaper housing being built in higher risk areas. Therefore, it sees the cause not as a chance interaction of events, but rather as an outcome of the social processes as different groups compete for scarce resources. This is a subset of a broader patterning of social life which arises as a consequence of the billions and billions of individual thoughts and actions which, despite their apparent randomness at individual level, produce contours or patterns socially.

The interactive and tandem explanations are brought together using the concepts of the life course and the lifeworld. Life-course sociology and life-course epidemiology have accumulated a significant body of evidence which shows that from the moment of conception to the moment of death, the human organism accumulates insults and benefits.[42] In health terms, these insults and benefits form a type of health profit and loss account which determines the health state of the individual at any one time. Some of these things are biological and are determined by the hereditary structure of the organism and the microbiological environment; others are a consequence of the vectors described above and their interaction with behaviour. They reflect the immediate physical, social, psychological and emotional environment of the growing child, and then the adult. The life-course approach also demonstrates that at critical points on life's journey, which are very highly socially patterned, benefits and insults can be greatly magnified, past insults can be cancelled out, and new benefits can come into play. It is also clear that these changes may be self-reinforcing, producing and reproducing patterns of health advantage and disadvantage. Those critical points on life's journey are like gateways, or forks in the road, setting in train patterns that may endure and have long-lasting effects.

It is also clear that the life course follows quite distinct patterns for different social groups. The trajectory through life for the child of a single mother in receipt of state benefits in public sector housing in an outer housing scheme in Glasgow will be very different to that of a child born to a professional couple in Surrey, and both will be quite different to that of a Bangladeshi girl born in Tower Hamlets in London. The direction in which people go at each gateway has a profound effect on their health future. The gateways and where they lead are markedly determined by social factors. On life's journey, the experience of benefits and insults to health occur in what some philosophers call the 'lifeworld'. The notion of the lifeworld was developed in phenomenological writings and, in the context used here, in the work of Schutz and Mead.[43–46] The idea also draws on some of the principles of the philosophy of the Enlightenment and the writings of Bishop Berkeley,[47] Rene Descartes[48] and David Hume.[49]

In the phenomenological formulation, the lifeworld is a cognitive and subjective place where we perceive and interpret the external environment, make our own decisions, decide upon our immediate actions, and judge ourselves and others. The lifeworld is also where we experience the social structure first-hand in the form of opportunities, barriers, difficulties and disadvantage, and it is where our emotions are played out and our feelings are expressed.

Every individual human being subjectively inhabits his or her own personal lifeworld. At its core is the subjective self, which is experienced as a continuous 'self' existing through time and space within a more or less familiar world of places and people. Although the lifeworld is uniquely personal, it is also inhabited by others who are recognized as physically and subjectively similar to, but separate from, the self. These others who inhabit the centre of our lifeworld are those individuals whom we meet and interact with, or think about and relate to, on a recurring basis. The people with whom we share our domestic arrangements, some of our workmates and perhaps friends and family, as well as those who are not intimates or friends but whom we meet with regularly, make up the lifeworld. It is the interaction, real or imagined, on a repetitive basis which defines the inner zones of the lifeworld. The level of intimacy is not the crucial issue. It is the repetitive and routine nature of the contacts with others that is important.

It is very important to note that the innermost zone of the lifeworld may not be, and Schutz never suggested it would be, a place that was benign and cosy. It may be experienced as violent and bullying. It may be cold and unforgiving. It may be unpleasant and chronically difficult. It will be the place where discrimination, marginalization, disadvantage, poverty and unemployment are experienced. However, it constitutes the centre of the existence of the person. Lifeworlds change as individuals move through space and time. Groups of intimates change; children grow up, leave home and move to a more distant part of the individual's lifeworld. New people come into our orbit of friends and acquaintances. The social group in the everyday lifeworld of contacts – direct and indirect, real, imaginary or virtual – is continually in a state of flux. The possible variability is enormous.

The lifeworld is the locus of experience: social, psychological and physical. It is that social and emotional space which all of us uniquely inhabit. It is the world of the everyday; the world of the immediate experience and the aspects of life that we take for granted. It is where life is at its most meaningful and its most painful. The lifeworld is also about the physical space which we inhabit. It is where the social meets the biological. Lifeworlds are the point at which stressors are moderated, mediated or exacerbated. It is the point where insults are parried or where they have their noxious effects. It is the point where vulnerabilities translate stressors into physical and emotional damage. It is where immunities – biological, physical or psychological – work their protective powers. Social disadvantage is characterized by the inability or lesser ability to control the lifeworld. Social advantage is characterized by the ability to make control of the lifeworld sustainable.

What is so striking about reading the work of the early public health pioneers is their eloquent testimony about damaging lifeworlds. The sheer brutality of life in the working class districts of Liverpool and Glasgow in the 19th Century – for example, the grinding nature of poverty and the social conditions in which disease flourished – are documented minutely. Disease flourished because the vectors coalesced to produce a lethal cocktail of dirt, hunger, bacteria, drunkenness, sexual licence, viruses and poverty. Although the precise presence of the microbiological organisms was not known or only dimly understood by the pioneers, the way in which the lifeworlds created vulnerability and attendant risk was very well described.[12,14] Social historians seem to have interpreted this to mean that it was self evident that disease would follow disadvantage, and indeed it does. However, unless one distinguishes analytically between the interactive and tandem explanations, the difference between individual- and population-level health gets very murky.

Conclusion

The trajectory through the life course, mediated through the lifeworld, is how structural factors – the vectors – determine health. The lifeworld is where the causal mechanisms of health inequities operate, and the pathways to ill health can be described. Disadvantage may be viewed as a differential opportunity (life chance) to control one's lifeworld.[50] Differences between lifeworlds are the social manifestations of differences in physical life chances. Lifeworlds operationalize the differential experiences of power, exploitation and access to resources. Where lifeworlds abut, the experience of discrimination and disadvantage originates, and the experiences of pain and suffering are located within the lifeworld.

Lifeworlds also group together and, although each one is unique, there are patternings and clusterings which produce shared experiences and what philosophers call intersubjectivity, i.e. a shared understanding and set of common meanings. It is the group properties of aggregated lifeworlds, the clustering of similar experiences, that produces the patterning of disease which epidemiology dramatically demonstrates. It is because of the individual operation of the factors which are damaging to health that we can observe the causal pathway from the social to the biological. The patterning is manifest in the differential exposure and vulnerabilities to disease and, conversely, protection from disease.

The summative effect is the degree of total exposure to pathogens and risks. Vulnerability may be biological, reflecting, for example, pre-existing nutritional or immunological status, or intercurrent illness. It may be psychological in that the ability to be resilient to stressors is, at least in part, a consequence of psychological processes. It will be social in that supportive social relations and economic security, for example, are considerably advantageous when dealing with stressors, and their absence both amplify and sometimes directly lead to inability to cope with stressors. It is not possible to predict individual health outcomes, and the reason for this is that the agency structure system is both patterned and has enormous variability.

In the end, it rather depends on how you look at it, and mostly we look at these phenomena through single-disciplinary lenses rather than holistically. To borrow an analogy from physics, what we are dealing with here is something akin to the uncertainty principle, and as with physics, the uncertainty operates at the micro level rather than at the system level itself.[51] Therefore, individual difference and variability is the stuff of human life. This variation means it is very difficult to predict at the level of individual behaviour. It is, however, so well patterned that accurate aggregate predictions can be made at group and population levels. Indeed, the patterning of human conduct is so marked that it is how social structures arise. Social structures are discernible both to scientists and to individuals themselves. The microbiology of disease is part of these processes. Disease is also moderated and affected by, as well as manifested in, the patterning effects. It is certainly complex, but it is also analysable, and the analytic process can yield clearer and more precise ways of thinking about prevention and health improvement.

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Competing interests

None.

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